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Original Article

Correlation Between NT pro-BNP, Troponin I and Inhospital Mortality in Miokard Akut Patients Who Have Already Undergone Percutaneous Coronary Intervention: a Report from ONE ACS Registry Subarea dr. Saiful Anwar Malang Hospital

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ABSTRACT

Background: Many research have looked into the potential of various biomarkers as predictors of intrahospital mortality in patients with STEMI. Patients with a history of heart failure, patients with STEMI with cardiogenic shock, and patients with heart failure all had a similar association between pro-BNP NT and intra-hospital mortality. In STEMI patients, troponin is another biomarker that can be utilized to predict intrahospital mortality with NT pro BNP.
Objectives: To determine the correlation between NT pro BNP and troponin I and intrahospital mortality in STEMI patients who had had PCI at RSUD dr. Saiful Anwar Malang.
Methods: A retrospective cohort research with an observational analysis design, targeted 391 STEMI patients who underwent PCI at RSUD dr. Saiful Anwar Malang between January 2018 and August 2022
Result: With AUC NT pro BNP 0.840 (95% confidence interval [CI]: 0.789 – 0.892) and troponin I AUC 0.818 (95% CI: 0.753 – 0.882), the ROC curve demonstrated a high degree of discriminating. It was determined that there was a strong correlation between NT pro BNP and intrahospital mortality in AMI EST patients who had had PCI, with a R value of 0.70; OR 10,484 (95% confidence interval [CI]: 7,731–19,366). With a R value of 0.4, there was a moderate connection between troponin I and intrahospital mortality in STEMI patients who had had PCI; the odds ratio was 6,167 (95% confidence interval: 2,286–16,637).
Conclusion: There were a strong and moderate correlation between NT pro BNP and troponin I, respectively, with inhospital mortality in STEMI patient.

1. Introduction

Acute myocardial infarction (AMI) is a condition characterized by the death of cardiac muscle cells due to an interruption in blood supply to the heart. After acute coronary occlusion, the coronary arteries are completely blocked off, with only a trickle of blood being able to flow through the collateral veins. An infarct occurs when the surrounding muscle either stops receiving blood altogether or receives such a low volume of blood that it can no longer perform its normal functions. Acute coronary syndromes (ACS) include stable angina pectoris, ST-elevation myocardial infarction (STEMI), and non-ST-elevation myocardial infarction (NSTEMI).[1]

An estimated one million Americans experience an AMI each year, with an additional 300,000 succumbing to the condition. Among the leading causes of death in Indonesia, heart disease is on the rise. Death rates from this cause have been rising steadily since 1996, as evidenced by the Household Health Survey (SKRT). From a low of 5.9% in 1975, heart disease deaths grew steadily to 9.1% in 1981, 16.0% in 1986, and 19.0% in 1995. Heart disease, which includes coronary heart disease, was the leading cause of death in the United States in 2001, according to census data. Riskesdas data from 2018 shows that the prevalence of heart and circulatory system diseases is on the rise. Cardiovascular illness affects at least 15 out of every 1,000 people, or 4.2 million persons in the United States. Of these, heart disease affects 2,784,064. According to the Institute for Health Metrics and Evaluation (IHME), coronary heart disease accounts for 14.4 percent of all deaths in Indonesia, including during hospitalization and after patients have been released. After revascularization, some patients die within the first two hours, while others can live for up to a

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month. The RO-STEMI (Romanian ST-elevation myocardial infarction) registry found a 7.1% ICU mortality rate for STEMI patients, while the AMIS-Plus (Swiss Acute Myocardial Infarction and Survival) registry found a 6.9% ICU mortality 10.6 on the MINAP (Myocardial Infarction National Audit Project) Registry, 14% on the DANISH Registry, 7% on the EURO Heart Survey and GRACE Registry11, and 14% on the DANISH Registry.

Many research have looked into the potential of various biomarkers as predictors of intrahospital mortality in patients with STEMI. Patients with a history of heart failure, patients with STEMI with cardiogenic shock, and patients with heart failure all had a similar association between pro-BNP NT and intra-hospital mortality, as reported by the ACTION(Acute Coronary Treatment and Intervention Outcomes Network) Registry in Virginia, United States. Peng Cheng He et al. (2016) conducted research in Guangdong, China, and found that NT-pro-BNP predicted in-hospital mortality in patients diagnosed with STEMI. NT-proBNP > 8582 pg/mL was reported to have a sensitivity of 76.5% and a specificity of 68% by Yash Paul Sharma et al. (2020) in South India.

In STEMI patients, troponin is another biomarker that can be utilized to predict intrahospital mortality with NT pro BNP. Previous studies have demonstrated that the cardiac marker troponin can be used to predict intrahospital mortality in patients who have experienced an ST-elevation myocardial infarction (STEMI). Brett et al. (2019) draw the conclusion that individuals with ST-elevation myocardial infarction who have high troponin levels13 are at an increased mortality risk based on data from NCDR (The National Cardiovascular Data Registry) in Michigan (STEMI). The peak troponin levels of STEMI patients who did not survive the first 24 hours, 30 days, or 1 year were higher than those of patients who did survive. This was according to a study conducted in Ireland by Khullar et al. A high troponin I value (3 ng/mL) upon admission can predict intrahospital and 1-year mortality in STEMI patients having PCI, according to a research by Zhao et al. (2022).

Numerous studies have shown that NT pro BNP and troponin are reliable predictors of intrahospital mortality in patients with STEMI; however, no such research has been conducted in Indonesia. Specifically, the researchers looked into the correlation between NT pro BNP and troponin I and intrahospital mortality in STEMI patients who had had PCI at RSUD dr. Saiful Anwar Malang.

2. Material and Methods

The design of this research was a retrospective cohort research with an observational analysis design. This study targeted all STEMI patients who underwent PCI at RSUD dr. Saiful Anwar Malang between January 2018 and August 2022.

The recruitment of the participants is all patients who met the selection criteria between January 2018 and August 2022 were consecutively included in the study sample. Data from the ACS registry were used to select the sample that satisfied the inclusion and exclusion criteria. Patients with STEMI who underwent PCI at RSUD Dr. Saiful Anwar Malang met the inclusion criteria. Exclusion criteria included incomplete data, patients who did not provide informed consent to participate in the study, patients admitted with a diagnosis of sepsis upon admission, patients with malignancy or other terminal disease, STEMI patients undergoing fibrinolytic therapy alone without PCI, patients with idiopathic cardiomyopathy, and congenital heart disease. malignancy, valvular heart disease, autoimmune or rheumatic heart disease

Spectrum ACS with typical anginal symptoms lasting more than 20 minutes and accompanied by persistent ST-segment elevation in two adjacent leads on the ECG and evidence of myocardial injury, as indicated by elevated cardiac troponin biomarker values with at least one value above the 99th percentile reference upper limit with necrosis in clinical settings consistent with myocardial ischemia, is the operational definition of STEMI. Information was obtained from the ACS registry and medical records. Intrahospital death refers to cardiac-related deaths that occur during hospitalization. The information was gathered from the ACS registry, the operant group, and medical records. Percutaneous coronary intervention is the use of a balloon and/or stent to unblock a blocked or constricted coronary artery. Performed in the catheterization laboratory of Malang's Saiful Anwar Hospital. The PCI outcomes were reviewed by the invasive cardiologist who performed or supervised the procedure. Shock is defined as a patient having a blood pressure of less than 90 mmHg or a cardiac index of less than 1.8 liters per minute, tissue hypoperfusion, and/or the need for inotropes, vasopressors, or an intraaortic balloon pump. Information was obtained from the ACS registry and medical records. A new blockage or bleeding stroke that develops during or after PCI throughout the treatment period is considered a stroke. As indicated by the CT scan. The data came from the ACS registry, the medical record, and the operant group. Arrhythmias are categorized as ventricular arrhythmias (ventricular tachycardia and ventricular fibrillation), supraventricular tachycardia (atrial fibrillation and atrial flutter), and bradyarrhythmias (total AV block, 2nd degree AV block, junctional). Acute renal failure is characterized by a rapid (within hours to weeks) drop in the glomerular filtration rate (GFR) that is typically reversible, followed by renal failure to eliminate nitrogenous metabolic wastes, with or without altered fluid and electrolyte balance. One of the following conditions is satisfied: a serum creatinine increase of 0.3 mg/dL or 26 mol/L within 48 hours; a serum creatinine increase of 1.5 times the reference value, which is known or suspected to have happened over the course of one week; or a urine output of 0.5 ml/kg/-day for more than six consecutive hours. HAP pneumonia is hospital-acquired pneumonia or pneumonia that is not in the incubation period at the time of hospital admission and occurs more than 48 hours after hospitalization. Indicated by increased infection indicators or chest X-ray. The information was retrieved from the ACS registry and medical records. Killip is a method for predicting and classifying the risk of death in people who have had an acute myocardial infarction by using information gleaned from the physical examination and the onset of heart failure. Killip class I patients have no outward signs of heart failure; class II patients have lung base crackles, 3rd heart sound (S3), and elevated jugular venous pressure; class III patients have acute pulmonary edema; and class IV patients have cardiogenic shock or hypotension (defined as systolic blood pressure less than 90 mmHg) with evidence of peripheral hypoperfusion (oliguria, cyanosis, altered mental status). TIMI is a score determined for STEMI patients based on 8 variables (age, diabetes/hypertension/angina, systolic100mmHg, HR>100, Killip II-IV, body weight67 kg, anterior ST elevation or LBBB, treatment time>4 hours), with a value between 0 and 14. GRACE is a score for patients with ACS based on 8 parameters, including age, pulse, systolic, creatinine, cardiac arrest at the first date, abnormal cardiac enzymes, and Killip class. The GRACE score is low (108), intermediate (89 -118), and high (>118) based on mortality predictors during treatment. Patients with ACS can have their risk of bleeding stratified according to the CRUSADE score, which ranges from 1-20 (very low) through 21-30 (low), 31-40 (moderate), 41-50 (high), and >50 (very high). The information is extracted from ACS registration data. Gender is the patient's gender, categorized as male or female. The information is extracted from medical records. Diabetes mellitus is determined according to the consensus of type 2 DM by PERKENI 2019, specifically if one of the following tests is positive: GDP > 126 mg/dl,

plasma glucose examination > 200 mg/dl after OGTT, GDS > 200 mg/dl + classic symptoms, HbA1C examination > 6.5%. The information is extracted from medical records. Diabetes mellitus is determined according to the consensus of type 2 DM by PERKENI 2019, specifically if one of the following tests is positive: GDP > 126 mg/dl, plasma glucose examination > 200 mg/dl after OGTT, GDS > 200 mg/dl + classic symptoms, HbA1C examination > 6.5%. The information is extracted from medical records. Diabetes mellitus is characterized according to the type 2 DM consensus of PERKENI 2019, specifically if one of the following tests is positive: GDP > 126 mg/dl, plasma glucose > 200 mg/dl after OGTT, GDS > 200 mg/dl + classic symptoms, or HbA1C > 6.5%.

Blood pressure more than or equal to 140/90 mmHg, or the patient's current or past use of antihypertensive medication, defines hypertension. Data was collected based on medical record information. Smoking is an acquired smoking habit based on a smoking history-related past. The definition of smoking cessation was the absence of smoking for at least one year. The information is extracted from medical record data. Alcohol is the habit of consuming alcohol based on a history of alcohol consumption. At least six months of abstinence from alcohol intake was defined as a cessation of alcohol consumption. The information is extracted from medical record data. The ejection fraction of the left ventricle measures the amount of blood pumped out of the heart with each pulse. Normal (> 50%), mid-range (40%-49%), and decreasing (40%) percentages.

Table 1. Baseline Characteristic.

Parameter	**Total (n=391)**	
	Rerata	**Standar Deviasi**
Age	57.31	10.83
Sex		
Woman	20.8%	
Man	79.2%	
Smoker	34.8%	
DM	39.9%	
HT	52.9%	
Dislipidemia	5.6%	
Systolic pressure	124.48	28.17
Diastolic pressure	75.65	15.68
Weight	64.45	11.96
TIMI score	4.54	2.61
GRACE score	176	29.46
CRUSADE score	37.67	22.08
NT pro BNP	5380	9429
Troponin I	6.47	8.60
EF	47.72	12.15
STEMI		
Anterior	28.4%	
Anterior ekstensif	11.5%	
Anteroseptal	5.4%	
Anterolateral	7.4%	
Inferior	23%	
Inferoposterior	14.8%	
Inferoposterior + RV infark	3.6%	
Posterior	0.8%	
Shock	26.1%	
Inhospital mortality	13%	

2. Statistical Analysis

The connection between NT pro BNP and troponin I on intrahospital mortality in STEMI patients who had PCI in RSUD dr. Saiful Anwar Malang was determined using the SPSS 22 program. Univariate analysis is descriptive statistics used to identify the attributes of an owned sample. This study's univariate analysis comprised of mean values, standard deviations, and percentages to evaluate the fundamental features of the research subjects. Age, Hb, leukocytes, Ur/Cr, blood sugar, HbA1c, troponin, and NT pro BNP were included in the mean. EF (normal, moderate, depressed), Tapse (normal, decreased), Lesion and clinical characteristics To determine the difference in the mean of troponin I and NT pro BNP between the intrahospital survival and mortality groups using the independent t-test if the normality test yielded normal data distribution using the Kolmogorov-Smirnov test and if the data distribution was not normal using the Mann-Whitney test. The independent t-test was deemed significant when p0.05 was attained. The chi-square test was utilized to determine the proportion of comorbidities among the patients of this research. If p0.05, the Chi-square test is deemed significant. Using multivariate analysis, the parameters that impact the incidence of intrahospital mortality in patients with AMI EST were determined. Analyse multivariate utilizing logistic and linear regression. The confidence level utilized is 95% (p = 0.05).

3. Result

This study is an analytic observational study with a retrospective cohort study design examining the association between NT pro BNP and troponin I with intrahospital mortality in STEMI patients who have undergone PCI. It was conducted at the RSUD dr. Saiful Anwar Malang between August and September 2022. In this study, a total of 568 STEMI patients who underwent PCI between January 2018 and August 2022 were utilized. Following selection according to inclusion and exclusion criteria, 391 patients served as research participants. The statistics on the individuals' fundamental features are displayed in Table 1.

As indicated in Table 2, a t-test was employed to assess the difference between groups of patients who suffered intrahospital death and patients who did not experience intrahospital death.

In Table 2, there are substantial disparities between the groups of patients who died in the hospital and those who did not die in the hospital. In Killip variable with a p-value of 0.000, NT pro BNP with a p-value of 0.000, troponin I with a p-value of 0.000, TIMI flow with a p-value of 0.000 GRACE with a p-value of 0.000, LAD involvement with a p-value of 0.001, and shock with a p-value of 0.000. This variable was an independent predictor of the incidence of intrahospital death, with a p-value 0.05. In addition, a multivariate analysis with logistic regression was performed on these factors, and the results are presented in Table 3.

Table 3. Multivariate Analysis

Parameter	P value
Killip	0.000
NT pro BNP	0.000
Troponin I	0.002
TIMI flow	0.265
GRACE	0.445
LAD	0.841
Syok	0.469

The study of these seven variables revealed that only three variables, killip, NT pro BNP, and troponin I, had a p-value 0.05, namely killip, NT pro BNP, and troponin I. As shown in Table 4, a multivariate analysis was conducted on the three variables listed.

Table 3. T-Test results.

Variable	**Survive (n=340)**	**Inhospital mortality (n=51)**	**P value**
Man	**78.5%**	**84.3%**	**0.444**
Smoker	**33.8%**	**41.2%**	**0.384**
DM	**41.5%**	**29.4%**	**0.137**
HT	**54.1%**	**45.1%**	**0.292**
Dislipidemia	**5.3%**	**7.8%**	**0.681**
Killip 1	**76.8%**	**31.4%**	**0.000**
2	**10.9%**	**9.8%**	
3	**4.1%**	**19.6%**	
4	**8.2%**	**39.2%**	
STEMI anterior	**29.4%**	**21.6%**	**0.111**
anterior ekstensif	**10.3%**	**19.6%**	
anteroseptal	**4.7%**	**9.8%**	
anterolateral	**7.9%**	**3.9%**	
inferior	**24.1%**	**15.7%**	
inferoposterior	**13.8%**	**21.6%**	
Inferoposterior + RV	**3.2%**	**5.9%**	
posterior	**0.9%**	**0.0%**	
LM disease	**12.6%**	**10%**	**1.000**
LAD	**61.2%**	**35.3%**	**0.001**
LCx	**66.9%**	**85%**	**0.153**
RCA	**85.3%**	**90%**	**0.799**
TIMI flow 0	**19.5%**	**64%**	**0.000**
1	**0.9%**	**0.0%**	
2	**12.9%**	**10%**	
3	**66.8%**	**26%**	
ACEI/ARB	**97.6%**	**96.1%**	**0.852**
Beta bloker	**74.4%**	**78.4%**	**0.657**
Syok	**22.6%**	**49%**	**0.000**
NT pro BNP	**4478 + 911**	**11479 + 933**	**0.000**
Troponin I	**4.9 + 5.9**	**16.6 + 14.7**	**0.000**
Age	**56 + 11**	**59 + 9**	**0.131**
BB	**64.7 + 11**	**62.3 + 13**	**0.207**
TDS	**125 + 27**	**120 + 30**	**0.334**
TDD	**75 + 15**	**74 + 17**	**0.555**
GRACE	**36 + 22**	**43 + 13**	**0.000**
TIMI	**4 + 2**	**6 + 3**	**0.197**
CKMB	**71 + 34**	**74 + 40**	**0.745**
HbA1C	**7 + 2**	**8 + 2**	**0.060**
EF	**47 + 11**	**46 + 13**	**0.622**

Note. significant if the p-value is 0.05 or lower

Table 4. Significant variable from multivariate analysis

Parameter	P value	OR (CI 95%)
Killip	**0.000**	**2.967 (1.852 – 4.751)**
NT Pro BNP	**0.000**	**10.484 (7.731 – 19.366)**
Troponin I	**0.000**	**6.167 (2.286 – 16.637)**

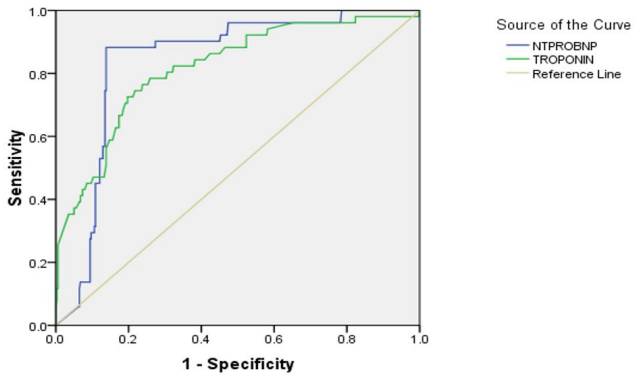

Figure 5. ROC curve

With AUC NT pro BNP 0.840 (95% confidence interval [CI]: 0.789 – 0.892) and troponin I AUC 0.818 (95% CI: 0.753 – 0.882), the ROC curve demonstrated a high degree of discriminating. The NT pro BNP 4390 cutoff value was also derived from the ROC analysis with a sensitivity of 0.882 and a specificity of 0.882. The threshold for troponin I was 7.9, with a sensitivity of 0.725 and a specificity of 0.80. From the examination of the connection, it was determined that there was a high link between NT pro BNP and intrahospital mortality in AMI EST patients who had had PCI, with a R value of 0.70; OR 10,484 (95% confidence interval [CI]: 7,731–19,366). With a R value of 0.4, there was a moderate connection between troponin I and intrahospital mortality in STEMI patients who had had PCI; the odds ratio was 6,167 (95% confidence interval: 2,286–16,637).

4. Discussion

According to the findings of this research, individuals diagnosed with STEMI and treated with PCI had an in-hospital death rate of 13%. Several prior studies employing registry data found that intra-hospital mortality was 7.1% in RO-STEMI (Romania STEMI Registry) (Diana, et al. 2015), 6.9% in AMIS-Plus Swiss Registry1 (Stolt Steiger V et al, 2019), 7% in EURO Heart Survey and GRACE Registry (Granger CB, et al. 2003), 10.6% in MINAP (Myocardial Infarction National Audit Project) Registry, and 14% in D (Gale CP et al, 2008).

4.1 The correlation between troponin I levels and inhospital mortality in STEMI patients admitted to the hospital

The levels of NT pro BNP and troponin were evaluated in this study, which included 391 patients hospitalized to RSUD Dr. Saiful Anwar Malang with a STEMI. Higher concentrations of troponin I were shown to have a moderate correlation with the incidence of in-hospital mortality (R = 0.4; p = 0.000). This was observed across all of these factors. When troponin levels were more than 7.9, the OR was 6.167 (95% confidence interval [CI]: 2.286–16.637). Multiple studies have consistently revealed a consistent, graded connection between increased troponin concentrations and the probability of mortality following ACS during the last decade.

In individuals who have suffered an ST-elevation myocardial infarction (STEMI), the troponin level can be utilized as a reliable indicator of whether or not the patient would pass away while in the hospital. According to the findings of a study carried out in Michigan and conducted by Brett et al. (2019), which makes use of NCDR (The National Cardiovascular Data Registry), the risk of death among STEMI patients rises with rising troponin levels13. In yet another study, carried out in Ireland by Khullar et al. (2022), the researchers found that individuals suffering from STEMI who did not survive the event had greater peak troponin levels than those who did. In yet another study, conducted by Zhao et al. (2022), the researchers found that high troponin I values (greater than 3 ng/mL) at the time of admission were able to accurately predict both the mortality rate in the hospital and the mortality rate after one year in STEMI patients who were undergoing PCI.

Surrogate signs of poor prognosis, such as a large infarct size, poor left ventricular remodeling, and microvascular blockage, have been linked to elevated levels of cardiac troponin I.

Depending on the degree of reperfusion, the peak in enzyme levels can occur anywhere from twelve to twenty-four hours after the first signs of illness, according to standard (i.e. non-high-sensitivity) TnT and TnI testing (Brett, 2019). An increased presenting troponin in an unrevascularized STEMI patient should never be mistaken for the "washout effect" that precedes successful reperfusion, despite the fact that the rapid increase in biomarkers following reperfusion of the infarct-related artery by thrombolysis and angioplasty in STEMI patients has been extensively characterized and may be used to predict the success of thrombolytic treatment. The period of ischemia has a significant impact on the levels of troponin detected in the early acute phase, as evidenced by a higher presenting troponin in a patient who has not had revascularization. Revascularization alone is not predictive of how long a patient will live, in contrast to peak troponin levels, which are dictated by the effectiveness of revascularization and the region of myocardium that is at risk from the artery connected with the infarct. Admission levels may provide critical objective insight into the degree and duration of prehospital ischemia, which is a key cause of higher mortality for persons in high troponin groups. Admission rates provide an objective measure of the severity and duration of prehospital ischemia (Brett, 2019).

4.2 *The correlation between NT pro BNP levels and inhospital mortality in STEMI patients admitted to the hospital*

The levels of NT pro BNP and troponin were evaluated in this study, which included 391 patients hospitalized to RSUD Dr. Saiful Anwar Malang with a STEMI. Higher amounts of NT pro BNP were shown to have a significant correlation with in-hospital mortality in patients diagnosed with STEMI (R = 0.7; p 0.000). The OR was 10,484 with a 95% confidence interval ranging from 7,731 to 19,366 when the level of NT pro BNP was more than 4390. Over the course of the last 10 years, several studies have consistently proven a consistent, graded association between increased concentrations of NT pro BNP and the likelihood of mortality following ACS. This link has been observed in both humans and animals.

There have been a number of studies done in the past that investigated a variety of biomarkers that have the potential to serve as predictors of intrahospital mortality in patients diagnosed with STEMI. Benjamin et al. (2013) from the ACTION (Acute Coronary Treatment and Intervention Outcomes Network) Registry in Virginia, United States states that there is an increased risk of intra-hospital death in STEMI patients with an increase in pro-BNP NT,

where there is no difference between the association between pro-BNP NT and intra-hospital mortality in STEMI patients with a history of heart failure, STEMI with cardiogenic shock, as well as in heart failure patient. The researchers concluded that there is an increased NT-pro-BNP was found to be a predictor of intra-hospital mortality in patients who had STEMI, according to a different study that was conducted in Guangdong, China, by Peng Cheng He et al. (2016). Yash Paul Sharma et al. (2020) conducted research in South India and found that an NT-proBNP level of more than 8582 pg/mL demonstrated a sensitivity of 76.5% and a specificity of 68%.

In patients diagnosed with STEMI, a test of NT pro BNP itself has not been performed as frequently as a study of troponin I. It would appear that clinicians only evaluate individuals for NT pro BNP who have a larger number of comorbidities and who would normally be regarded to be at the highest risk. We discovered that the use of NT pro BNP considerably improved the risk discrimination for in-hospital mortality in more than 391 patients who were diagnosed with STEMI. Even among individuals who would normally be thought to have a reduced risk based on either their Killip presentation or their GRACE score, the researchers discovered an incremental improvement in risk categorization. Therefore, the population that would normally be regarded to be at a low risk may be the one in which the NT pro BNP test might potentially offer the most additional value for risk classification. The development of particular treatment plans that are aimed at individuals who have higher concentrations of NT pro BNP should be the primary focus of any future prospective trials that are conducted.

When combined with cardiac troponin, NT pro BNP is shown to give additional prognostic information, according to the findings of a number of studies (Sharma et al, 2020). It would suggest that the measurement of NT pro BNP, in addition to baseline clinical factors and quantitative findings of cardiac troponin, is able to enhance risk classification of patients diagnosed with STEMI. There is a paucity of consistent evidence about how an elevated NP result should direct particular therapy or treatment in ACS. However, some studies, but not all of them, show that revascularization may improve outcomes in patients who have an elevated NT pro BNP. To better define the efficacy of regular testing of NT pro BNP in ACS, studies that are especially designed to examine whether specific treatment options aimed at individuals with higher NT pro BNP can reduce the associated risk or are beneficial to follow therapy are required (Benjamin, 2013).

5. Conclusion

There was a significant strong correlation between NT pro BNP and inhospital mortality in STEMI patients. On the other hand, there was a moderate correlation between troponin I and inhospital mortality.

6. Declarations

6.1. Ethics Approval and Consent to participate
This study was approved by local Institutional Review Board, and all participants have provided written informed consent prior to involvement in the study.

6.2. Consent for publication
Not applicable.

6.3. Availability of data and materials
Data used in our study were presented in the main text.

6.4. Competing interests
Not applicable.

6.5. Funding source
Not applicable.

6.6. Authors contributions
Idea/concept: DIS, SA. Design: DIS, SA. Control/supervision: SA, AR, MSR, IP. Literature search: SA, AR, MSR, IP. Data extraction: DIS, SA. Statistical analysis: DIS, SA. Results interpretation: DIS, SA. Critical review/discussion: NK, IP, CT, BS. Writing the article: DIS, SA. . All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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